Patellar tendinopathy

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Chapter 2

The impact of patellar tendinopathy on sports and work performance in active athletes

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ABSTRACT

Background/aim: Greater insight into sports and work performance of athletes with patellar tendinopathy (PT) will help establish the severity of this common overuse injury of the patellar tendon. Primary aim of this exploratory study is to investigate the impact of PT on sports and work performance among athletes with PT. Secondary aim is to explore which personal, sports-related and work-related factors are associated with decreased work and sports performance.

Methods: Participants in this survey were 77 active athletes with PT (50 males; average age 28.1±8.2 years; VISA-P 56.4±12.3). Sports performance, work ability and work productivity were assessed using the Oslo Sports Trauma Research Center (OSTRC) overuse injury questionnaire, the single-item Work Ability Index (WAI) and the QQ quantity questionnaire respectively.

Results: Reduced sports performance was reported by 55% of the participants; 16% reported reduced work ability and 36% decreased work productivity, with 23% and 58% respectively for physically demanding work. More symptoms of PT (lower VISA-P score), more problems during sports (higher OSTRC score) and having physically demanding work were associated with decreased work performance. A lower VISA-P score was associated with decreased sports performance.

Conclusions: This study shows that the impact of PT on sports and work performance is substantial. The impact of PT on physically demanding work is particularly large. The results from this study add to the knowledge about the severity of PT and stress the importance of developing preventive measures for this sports injury.

INTRODUCTION

Patellar tendinopathy (PT) is a painful overuse injury of the patellar tendon. The pain that characterises this chronic injury is activity-related and is often located just below the patella, proximally in the tendon. High prevalence rates are found especially in jumping athletes.[1] Despite the numerous treatment options currently available,[2] treatment outcomes remain variable and none of them guarantee complete recovery. As a result, the complaints tend to be long-lasting.[3] The development of preventive measures is therefore extremely important. In order to prevent injuries, according to the 'sequence of prevention' described by van Mechelen et al. (1992) the extent of the problem should be unravelled first, not only in terms of frequency – incidence or prevalence – but also in terms of severity.[4 5]

Important factors for determining the severity of sports injuries include 'sporting time lost' and 'working time lost'.[4] As was discussed in several studies,[5 6] sporting time lost is probably not an accurate measure to gain insight into the severity of overuse injuries like PT, as symptoms or functional limitations arise gradually and most athletes continue doing sports despite their symptoms, especially early on. When the problem worsens, athletes are forced to adapt their training and often seek medical assistance. Only after a period of failed attempts at injury management will athletes quit sports participation.[6] Hence only the more severe and longer-standing problems resulting in inability to participate in sports would be captured measuring sporting time lost. Assessing functional level or limitations in performance are more suitable ways to determine injury severity.[5]

Similar to what was found in sports, measuring working time lost (absence) would not be sufficient to gain insight into the impact of PT on work. The effect of PT on work is scarcely investigated; one study found that patients with PT do not change or quit jobs because of their knee problem,[3] but another study found that PT can influence work performance negatively.[7] The latter study found among 18-35-year-old basketball and volleyball players that especially people with heavy, physically demanding work indicated being impaired in their job performance (in sports-related work 50% and in non-sports-related work 27%). Also the productivity at work seemed lower.[7]

Gaining more insight into sports performance (the limitations during sports) and work performance levels (the limitations during work) of athletes with PT will help establish the severity and related impact of this common injury. The primary aim of this exploratory study is therefore to investigate the impact of PT on sports performance and work performance in athletes with PT. The secondary aim is to explore which personal characteristics, sports-related factors and work-related

factors are associated with decreased work and sports performance.

METHODS

Study population and design

This survey was conducted between February 2013 and June 2015, and was administered among participants of two studies on the effectiveness of a patellar strap for PT (ethical approval METc 2012/378 and METc 2014/528).[8] Informed consent was obtained from all individual participants included in the study. Athletes between the ages of 18 and 50 who were clinically diagnosed with patellar tendinopathy by an experienced sports clinician were invited to take the survey. Only active athletes who had current symptoms in one or both knees over three months and a Victorian Institute of Sport Assessment Patella (VISA-P) score below 80 [9 10] were included. Patients with chronic joint diseases or signs or symptoms of other knee pathologies were excluded.

Questionnaires

Using the questionnaires, information was obtained about athletes' 1) baseline characteristics, 2) sports performance and 3) work performance.

1) Baseline characteristics

Personal characteristics were obtained through a baseline questionnaire. Questions about the type of sport(s) athletes were involved in, the duration of their sports performance, training volume and level of participation were also included. Finally, participants were asked about the duration of their symptoms (in months).

2) Sports performance

The Dutch translation (as used in the study by Pluim et. al, 2015[11]) of the Oslo Sports Trauma Research Centre (OSTRC) overuse injury questionnaire of Clarsen et al. (2013) was used to evaluate the impact of PT on the ability to participate in sports. The OSTRC overuse injury questionnaire has good internal consistency (Cronbach's alpha of 0.91)[6 12] and is considered valid.[13] The questionnaire consists of four items asking questions about sports performance related to the knee problems in the previous period. The first item assesses difficulties when participating in sports, the second asks about reductions in training volume, the third the extent to which the performance is affected, and the fourth how much knee pain was present during sports. The sports performance ranges from 0 (no difficulties) to 100 (maximum level of difficulties during sports).[6] Clarsen et al. considered an injury to be substantial when moderate or severe reductions in training volume (item 2) or sports performance

(item 3) were documented or when there was complete inability to participate.[13] In this study we use these criteria described by Clarsen to classify participants as having low or high sports performance. Participants were classified as having low sports performance when the criteria for a substantial injury were met. In addition, athletes were asked how many days they were unable to (fully) participate in sports in the preceding week.

3) Work performance

Participants were asked if they had a paid job, for how many hours, and if the job was physically demanding, mentally demanding or mixed (both physically and mentally demanding). In addition, the single-item work ability index (WAI)[14 15] was included, comparing current work ability with lifetime best work ability. The single-item WAI can be used as a simple indicator of self-assessed work ability[14] and has a very strong association with the seven-item WAI questionnaire, which in turn relates well with clinically assessed factors.[16] The score on the single-item WAI ranges from 0 (not able to work) to 10 (work ability at its best). A score <8 is considered as low working ability, a score ≥8 is considered as high working ability.[17] The Quantity and Quality (QQ) questionnaire[18] was used to gain insight into the quantity and quality of work the participants experienced. Participants were asked to rate their current quantity and quality of work compared to what it would be like if they had no symptoms of PT. The score ranges from 1 (no productivity/quality of work) to 10 (full productivity/optimal quality). Participants with a score <10 are considered to have decreased productivity and/or quality of work. The QQ questionnaire relates well with the objective work output.[19]

Analysis

Participants were included when all questionnaires were filled out in their entirety. The results were presented as frequencies, means and standard deviations, except for PT duration and hours of work per week (median and interquartile range) because of skewness of the data. A univariate logistic regression analysis was used to investigate which characteristics were possible predictors for low work ability, decreased productivity and low sports performance. Since the PT duration and the hours of work per week were skewed, these variables were categorised before including them in the regression. Data were analysed using SPSS Statistics version 22. The level of significance was set at $p < 0.05$.

RESULTS

Of the 120 participants who filled out the questionnaires, 77 were included in the analysis. Seventeen participants were excluded because one or more questionnaires were missing. Additionally, 26 participants without a job (of which 24 students) were excluded. Participant characteristics are shown in Table 1.

Table 1: Descriptive statistics of the participants

N		77
Personal characteristics		
	Age (years)	28.1 (8.2)
	Gender (male/female)	50 / 27
	BMI[a] (kg/m^2)	23.8 (2.9)
Injury-related factors		
	Knee PT (left/right/both)	18 / 22 /37
	VISA-P (0-100)	56.4 (12.3)
	PT duration (months)	18.0 (28.0)
Sports-related factors		
	Playing level (recreational/regional/national/international)[b]	32 / 29 / 15 / 1
	Sport (hours per week)[b]	4.5 (2.2)
Work-related factors		
	Type of work (physical/ mental/ mixed)	26 / 35 / 16
	Working hours per week	32.0 (27.5)

Displayed values are frequencies and means (SD), except for PT duration and working hours per week (median and interquartile range). [a]Body Mass Index, [b]primary sports.

Sports performance

Table 2 shows the distribution of scores on the OSTRC overuse injury questionnaire. The median number of days that participants were unable to do sports the preceding week was 0 (IQR 1.3). Forty-two out of 77 participants (54.5%) were classified as having low sports performance.

Table 2: Frequency distribution on the Oslo Sports Trauma Centre (OSTRC) overuse injury questionnaire

	n (%)
Total	77 (100)
Participation	
Full participation without knee problems	4 (5.2)
Full participation, but with knee problems	45 (58.2)
Reduced participation due to knee problems	22 (28.6)
Can not participate due to knee problems	6 (7.8)
Volume of training	
No reduction	29 (37.7)
To a minor extent	23 (29.9)
To a moderate extent	9 (11.7)
To a major extent	13 (16.9)
Can not participate at all	3 (3.9)
Performance	
No effect	7 (9.1)
To a minor extent	28 (36.4)
To a moderate extent	13 (16.9)
To a major extent	25 (32.5)
Can not participate at all	4 (5.2)
Symptoms	
No pain	3 (3.9)
Mild pain	31 (40.3)
Moderate pain	28 (36.4)
Severe pain	15 (19.5)
Mean (SD)[a]	45.1 (23.2)

[a] *A score of 0 on the OSTRC overuse injury questionnaire indicates optimal sports performance, 100 indicates no sports performance*

Work performance

Table 3 shows the distribution of the score on the single-item WAI and the QQ questionnaire. Twelve participants (16.0%) had a score below 8 on the single-item WAI (range 3-7), 28 participants (36.4%) had decreased work productivity (QQ Quantity <10) due to their knee problems and 22 participants (28.6%) had a QQ quality scale <10. As the quantity and quality scales of the QQ were strongly correlated (Spearman's Rho r=0.66), only the results from the QQ quantity scale will be presented in further detail.

Table 3: Frequency distribution on WAI and QQ Quantity

Score	WAI	QQ Quantity
	n (%)	n (%)
0	0 (0)	-
1	0 (0)	0 (0)
2	0 (0)	0 (0)
3	0 (0)	0 (0)
4	1 (1.3)	0 (0)
5	1 (1.3)	1 (1.3)
6	1 (1.3)	3 (3.9)
7	9 (11.7)	6 (7.8)
8	16 (20.8)	4 (5.2)
9	22 (28.6)	14 (18.2)
10	27 (35.1)	49 (63.6)
Total	77	77
Mean (SD)	8.8 (1.3)	9.3 (1.2)

Of the 26 participants who had physically demanding work, 23.1% had a WAI score below 8 and 57.7% had a decreased QQ quantity score. In the group of 35 participants who performed mentally demanding work these percentages were 8.6% for WAI and 20.0% for QQ quantity. Of the participants who did mixed work (n=16), 18.8% scored below 8 on the WAI, and 37.5% had a decreased QQ quantity score.

Factors associated with decreased work and sports performance

Table 4 presents participants' characteristics of the work ability (WAI), work productivity (QQ quantity) and sports performance (OSTRC overuse injury questionnaire), split into high and low for the WAI and OSTRC and into decreased and normal for QQ quantity.

Table 5 presents the results from the logistic regression analysis. In terms of personal characteristics no associations were found for decreased work or sports performance. In the injury-related factors, a lower VISA-P score (indicating more symptoms) increased the odds of having low work ability and low sports performance. In the sports-related factors, a higher score on the OSTRC overuse injury questionnaire (more problems during sports) was found to be significantly associated with low work ability. In the work-related factors, physically demanding work resulted in significantly higher odds of having decreased work productivity than for mentally demanding work.

Table 4: Characteristics of participants with decreased and good work and sports performance

	Low work ability (*n*=12)	High work ability (*n*=65)	Decreased productivity (*n*=28)	Normal productivity (*n*=49)	Low sports performance (*n*=42)	High sports performance (*n*=35)
Personal characteristics						
Gender						
Male	6 (50)	44 (68)	17 (61)	33 (67)	28 (67)	22 (63)
Female	6 (50)	21 (32)	11 (39)	16 (33)	14 (33)	13 (37)
Age	27.5 (10.2)	28.2 (7.9)	27.6 (8.5)	28.3 (8.2)	28.3 (8.9)	27.8 (7.5)
Length *in m*	1.8 (0.1)	1.8 (0.1)	1.8 (0.1)	1.8 (0.1)	1.8 (0.1)	1.8 (0.1)
Weight *in kg*	78.8 (13.8)	80.7 (11.4)	79.3 (15.5)	81.0 (9.1)	80.7 (13.8)	80.1 (9.0)
BMI[a]	23.8 (2.7)	23.8 (3.0)	23.8 (3.3)	23.8 (2.7)	24.0 (3.4)	23.4 (2.2)
Injury-related factors						
Knee PT						
Left	2 (17)	16 (25)	3 (11)	15 (31)	10 (24)	8 (23)
Right	3 (25)	19 (29)	9 (32)	13 (27)	12 (29)	10 (29)
Both	7 (58)	30 (46)	16 (57)	21 (43)	20 (48)	17 (49)
VISA-P (0-100)	47.8 (13.8)	58.0 (11.4)	53.7 (12.1)	58.0 (12.2)	53.2 (12.3)	60.3 (11.3)
PT duration (months)	27.5 (34.3)	17.0 (27.5)	18.0 (28.5)	16.0 (27.5)	15.5 (24.4)	24.0 (36.0)
Sports-related factors						
Playing level[b]						
Recreational	4 (33)	28 (43)	11 (39)	21 (43)	21 (50)	11 (31)
Regional	4 (33)	25 (39)	11 (39)	18 (37)	15 (36)	14 (40)
National	4 (33)	11 (17)	6 (21)	9 (18)	6 (14)	9 (25)
International	0 (0)	1 (2)	0 (0)	1 (2)	0 (0)	1 (3)
Sport (hrs per week)[b]	5.4 (2.8)	4.3 (2.1)	4.5 (2.5)	4.5 (2.1)	4.1 (2.3)	4.9 (2.2)
Total hrs sport week	7.6 (3.6)	6.0 (2.9)	6.8 (3.5)	6.0 (2.8)	5.7 (2.8)	6.9 (3.2)
OSTRC score (100-0)	59.7 (22.0)	42.4 (22.5)	50.7 (22.3)	41.9 (23.2)	-	-
Work-related factors						
Type of work						
Mental	3 (25)	32 (49)	7 (25)	28 (57)	18 (43)	17 (49)
Mixed	3 (25)	13 (20)	6 (21)	10 (20)	7 (17)	9 (26)
Physical	6 (50)	20 (31)	15 (54)	11 (22)	17 (41)	9 (26)
Hrs per week	34.5 (34.3)	32.0 (27.0)	32.0 (25.8)	32.0 (28.0)	32.0 (26.0)	32.0 (28.0)
WAI (0-10)	-	-	7.9 (1.2)	9.2 (1.1)	8.6 (1.4)	8.9 (1.0)
QQ quantity (1-10)	7.8 (1.0)	8.5 (0.9)	-	-	9.2 (1.2)	9.3 (1.3)

Displayed values are frequencies (percentage) and means (SD), except for PT duration and hours per week (median and interquartile range). [a] Body Mass Index, [b] Primary sports.

Table 5: Results from the univariate logistic regression analysis for reduced WAI, QQ quantity and having low sports performance.

	Work ability Ref = low		Productivity Ref = decreased		Sports performance Ref = low	
	OR	95% CI	OR	95% CI	OR	95% CI
Personal characteristics						
Gender (ref = male)						
Female	2.1	0.6-7.3	0.7	0.3-2.0	0.8	0.3-2.2
Age	1.0	0.9-1.1	1.0	0.9-1.0	1.0	1.0-1.1
Length in m	0.0	0.0-20.1	0.0	0.0-5.7	0.1	0.0-17.1
Weight in kg	1.0	0.9-1.0	1.0	0.9-1.0	1.0	1.0-1.0
BMI[a]	1.0	0.8-1.2	1.0	0.9-1.2	1.1	0.9-1.3
Injury-related factors						
Knee PT (ref=unilateral)						
Bilateral	1.6	0.5-5.7	1.8	0.7-4.5	1.0	0.4-2.4
VISA-P (0-100) (10 pnt increase)	0.5*	0.3-0.9	0.7	0.5-1.1	0.6*	0.4-0.9
PT duration (ref=<6 months, n=10)						
6-12 months, n=21	1.3	0.1-14.9	0.4	0.1-2.0	0.6	0.1-3.6
12-24 months, n=25	0.7	0.1-8.5	0.5	0.1-2.7	0.4	0.1-2.6
>24 months, n=32	2.0	0.2-19.6	0.7	0.1-3.4	0.2	0.0-1.4
Sports-related factors						
Playing level (ref=recreational)						
Regional	1.1	0.3-5.0	1.2	0.4-3.6	0.6	0.2-1.6
National	2.5	0.5-12.0	1.3	0.4-4.8	0.3	0.1-1.3
International	-	-	-	-	-	-
Sport (hrs per week)[b]	1.2	0.9-1.6	1.0	0.8-1.2	0.8	0.7-1.0
Total hrs sport week	1.2	1.0-1.4	1.1	0.9-1.3	0.9	0.7-1.0
OSTRC (100-0) (10 pnts increase)	1.4*	1.1-1.9	1.2	1.0-1.5	-	-
Work-related factors						
Type of work (ref=mental)						
Mixed	2.5	0.4-13.8	2.4	0.6-8.9	0.7	0.2-2.4
Physical	3.2	0.7-14.3	5.5 **	1.8-17.0	1.8	0.6-5.1
Hrs per week (ref=<16 hours, n=31)						
16-32 hours, n=17	0.4	0.0-3.7	1.1	0.3-4.3	2.3	0.6-9.0
32-40 hours, n=29	0.6	0.1-2.8	1.0	0.3-2.9	1.2	0.4-3.4
>40 hours, n=11	2.0	0.4-10.4	1.2	0.3-5.3	1.0	0.2-4.2
WAI (0-10)	-	-	0.4 **	0.2-0.6	0.8	0.6-1.2
QQ quantity (1-10)	0.4**	0.2-0.6	-	-	1.0	0.7-1.4

*[a] Body Mass Index, [b] Primary sports. Significant predictor of decreased work ability productivity at work or for decreased sports performance *p<0.05, ** p<0.01.*

DISCUSSION

The primary aim of this study was to investigate the impact of PT on sports and work performance. The impact on both sports and work performance is found to be substantial with 55% of the PT athletes having decreased sports performance, 16% having decreased work ability and 36% having decreased productivity. Especially considering that the athletes in this study were active and relatively young. The secondary aim was to explore which factors were associated with decreased work and sports performance. The most evident result was that having PT is related to decreased work productivity in athletes with heavy physical demanding work.

Sports performance

The OSTRC overuse injury questionnaire, used in this study to measure sports performance, shows that almost all athletes experience problems during athletic performance while as expected the time loss as a result of PT is low. More than half of the participating athletes had a decreased sports performance – moderate or severe reductions in training volume or sports performance, or complete inability to participate in training or competition.[12] The OSTRC overuse injury questionnaire is designed to monitor the severity of overuse injuries in a select group of athletes and not in a specific injured population, as was done in the current study.[6] To our knowledge, no severity scores are known for other overuse injuries. As a result, the impact of PT cannot (yet) be compared to the consequences of other overuse injuries in sports.

Work ability

Since a reduced work ability has proven to predict long-term sickness absence, decreased work performance, productivity loss, more healthcare use and early exit from work, it is important to assess the concept of work ability.[14 20-22] A large Finnish health survey showed that in an average working population of 30-64-year-olds, 8% of the women and 7% of the men reported having limited work ability (measured using WAI); for physically demanding work these percentages were 13% and 10% respectively.[17] In this average working population the decreased work ability is a lot smaller than what was found in the current study for active athletes with PT (16% among the total population and 23% among those with physical demanding work). This may indicate that PT has a negative influence on work ability.

Work productivity

Assessing the impact on productivity at work is particularly interesting because the majority of the costs related to an injury are caused by lost productivity while being at work.[23] The current findings demonstrate an even larger impact of PT on work productivity than was found in the 18-35-year-old basketball and volleyball players of van der Worp et al.[7] In the present study work productivity decreased in 36% of the participants, whereas in the study of van der Worp et al (2011) only 8% had decreased work productivity. This could be due to some differences in populations, but the most plausible explanation for this difference is that the current study uses more sensitive measurement instruments to assess work productivity. Our participants had to choose between 10 answer options (0 (no work productivity) – 10 (optimal work productivity)) compared to the study of van der Worp et al.[7] which had a binary response option ('yes' and 'no'). It is likely that those athletes wouldn't have answered 'yes' when experiencing small reductions in productivity, but the current study did measure these small reductions.

Surprisingly, hardly any data about work performance in other tendinopathies are available. In patients with upper extremity disorders seeking medical advice (29% epicondylitis medialis and lateralis, 28% rotator cuff tendinitis or impingement syndrome), 56% had reduced productivity at work.[24] It seems logical for upper extremity pain to result in a larger decrease in productivity compared to a knee injury, as the upper extremities are involved in all types of work (mental, physical and mixed). Among workers with mild-to-moderate knee osteoarthritis with an average age of 53, 40% reported experiencing productivity loss due to knee symptoms compared to a regular working day.[23] This is comparable with the results of our younger population of athletes with PT (36% with decreased work productivity). A study by Meerding et al. (2005) showed that 5-12% of industrial and construction workers had reduced work productivity as a result of health problems.[19] Given the high physical demands of industrial and construction work, a comparison with our participants who had physically demanding work is reasonable Almost 58% of the athletes with PT who had physically demanding work had decreased work productivity. It can therefore be concluded that PT certainly has an effect on work productivity, especially when physically demanding work is involved, and as a result the financial effect will be considerable.

Associated factors with decreased work and sports performance

The second aim of this study was to investigate which factors were associated with decreased work and sports performance. Having more symptoms (lower VISA-P score) was the sole determining factor found for having low sports performance –

this is a common-sense association which may also have been enhanced by the fact that sports performance is part of the VISA-P questionnaire (40 out of 100 points).[10] As already demonstrated by van der Worp et al.,[7] type of work is clearly related to the impact of PT on work performance. This is not surprising, given that a negative association is found between physical work and productivity at work,[23] and because PT is an overuse injury with mainly activity-related symptoms, logically symptoms will be present foremost in physically demanding work. In agreement with previous studies, having more symptoms was found to be related to decreased work ability.[23 25] The finding that a higher OSTRC score (indicating more limitations during sports) increased the odds for having decreased work ability demonstrates a relationship between work and sports performance. Nine patients with low sports performance also had a low WAI score (data not shown); the other 33 patients only had low sports performance. This indicates that most of the time having low sports performance is not accompanied by decreased work ability, whereas in most cases (9 out of 12, 75%) having decreased work ability is also associated with decreased sports performance. Those nine patients who scored low on both aspects – and not solely on sports performance – seem to have more symptoms (VISA-P 47±15 compared to 55±11), a longer duration of symptoms (median 24±105 months compared to 15±17 months), more hours of sports a week (7±4 hours compared to 5±2 hours) and more physically demanding work (56% physical, 33% mental, 11% mixed compared to 36% physical, 46% mental and 18% mixed), although this is not statistically significant.

Limitations

There are some limitations in this study that should be kept in mind. The first limitation has to do with the relatively small sample size and generalizability of the population. The number of participants with low work ability was small (n=12), therefore no multiple regression analysis could be performed because of a lack of power. It might also be that the athletes included in this study are not entirely representative. Our PT population consisted of athletes still actively playing; while those who were no longer participating in sports were excluded. This has most probably led to an underestimation, indicating that the actual impact of PT on sports and work participation is even larger than reported in the present study. Our study population furthermore included many students who had side jobs, resulting in a relatively low average age and a rather large group that worked for less than 16 hours.

A second limitation is related to the questionnaires used. The QQ quantity questionnaire and the OSTRC overuse injury questionnaire specifically asked if one experienced limitations in work or sports because of symptoms of PT, therefore

these results represent the consequences of PT on work productivity and sports performance experienced by the athlete. The single-item WAI, which compares one's current work ability with the lifetime best, is associated with several factors (e.g. high work demands, lack of autonomy, lack of leisure-time physical activity, obesity, older age),[26] but as not all these associated factors were measured and therefore could not be included in the analysis, the obtained work ability results may be influenced by factors other than PT. Finally, since this study has a cross-sectional design, the causality of the factors associated with decreased sports and work performance cannot be established.

Recommendations

A specific recommendation for future studies is to also include inactive athletes with PT in addition to active athletes who are still participating in sports. By analysing the total PT population, better insight into the actual impact of this injury on work (and sports) performance can be obtained. It might furthermore be interesting to exclude students with side jobs or to analyse this group separately. The questionnaires we used are monitoring instruments, important in identifying whether there is a problem and its extent. It would be certainly interesting to investigate in future research the exact underlying cause of decreased sports and work performance in addition. As the current study shows that the impact on both sports and work participation is considerable, this stresses even more the need for additional research into the development of effective preventive measures for PT.

Conclusion

The present study shows that the severity and the related impact of the sports injury of patellar tendinopathy on sports as well as on work performance is substantial, especially considering that solely actively playing athletes with PT were included. The impact of PT on work is particularly large among those who do physically demanding work. It is important to do more research into the impact of PT on both the sports and the work performance domains. The results of this study already provide more knowledge about the severity of PT, which is an important yardstick towards the development of preventive measures for this injury.

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